

**UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF ILLINOIS  
EASTERN DIVISION**

HFT Solutions, LLC,

*Plaintiff,*

vs.

Citadel Securities LLC,

*Defendant.*

Case No. 1:24-cv-13213

**JURY DEMANDED**

**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff HFT Solutions, LLC (“HFT Solutions”) files this complaint against Defendant Citadel Securities LLC (“Citadel”), alleging infringement of U.S. Patent Nos. 10,931,286, 11,128,305, and 11,575,381.

**PLAINTIFF HFT SOLUTIONS AND THE ASSERTED PATENTS**

1. Plaintiff is a corporation organized under the laws of the State of Delaware, with a principal place of business at 65 Locust Avenue, Suite 300, New Canaan, CT 06840.
2. Plaintiff is the owner of all right, title, and interest in U.S. Patent No. 10,931,286, titled “Field programmable gate array with external phase-locked loop,” and issued February 23, 2021. A copy of the ’286 patent is attached as Exhibit 1.
3. Plaintiff is the owner of all right, title, and interest in U.S. Patent No. 11,128,305, titled “Field programmable gate array with external phase-locked loop,” and issued September 21, 2021. A copy of the ’305 patent is attached as Exhibit 2.

4. Plaintiff is the owner of all right, title, and interest in U.S. Patent No. 11,575,381, titled “Field programmable gate array with external phase-locked loop,” and issued February 7, 2023. A copy of the ’381 patent is attached as Exhibit 3.

**DEFENDANT AND THE ACCUSED INSTRUMENTALITIES**

5. On information and belief, Defendant Citadel Securities LLC is a corporation organized under the laws of Delaware, with a principal place of business at 131 South Dearborn Street, Chicago, IL 60603 USA.

6. On information and belief, Citadel is a trading firm engaged in various high frequency trading strategies. High frequency trading strategies are reliant on the speed at which certain transactions can be made to provide a superior market return. These strategies fundamentally rely on being able to execute trades faster, sometimes microseconds or nanoseconds faster, than competitors.

7. The Accused Instrumentalities are FPGA systems and platforms made, used, offered for sale, sold, or imported by Defendant in the United States since February 23, 2021, including trading systems and platforms that include FPGA boards such as the Bittware XUP-VV8 and AMD Alveo UL3524 and UL3422 FPGA boards. On information and belief, Xilinx, maker of the FPGAs in the Bittware XUP-VV8 board, was acquired by AMD in June 2022. *See* <https://www.amd.com/en/newsroom/press-releases/2022-2-14-amd-completes-acquisition-of-xilinx.html>.

8. On information and belief, in order to achieve competitive trading speeds, Citadel uses the fastest available FPGA systems and platforms, including the Accused Instrumentalities which Citadel configures and uses in the manner reflected in Exhibits 4-6. *See, e.g.,* <https://www.youtube.com/watch?v=q2dtZB39MG4> (“[W]e invest massive resources internally and with AMD as our partner to take microseconds, nanoseconds and soon picoseconds off our

latency ... [a]nd for the most latency sensitive strategies that we run, Xilinx FPGAs are absolutely essential.”); <https://www.amd.com/en/products/accelerators/alveo/ul3524.html> - [product-brief](#) (“The device features a breakthrough transceiver architecture to achieve less than 3ns latency for world-class trade execution, delivering 7X greater performance vs. previous FPGA technology.”).

### **JURISDICTION AND VENUE**

9. This action arises under the patent laws of the United States, Title 35 of the United States Code.

10. This Court has original subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

11. This Court has personal jurisdiction over Defendant in this action because Defendant has committed acts of infringement within this District giving rise to this action, has a regular and established place of business in this District, and has established minimum contacts with this forum such that the exercise of jurisdiction over Defendant would not offend traditional notions of fair play and substantial justice.

12. Defendant, directly and/or through subsidiaries or intermediaries, conducts its business extensively in this District, including by operating electronic trading platforms, performing trading and market making activities, and providing financial services to customers. Defendant regularly does business or solicits business, engages in other persistent courses of conduct, and/or derives substantial revenue from products and/or services provided to entities in Illinois, and commits acts of infringement of the Asserted Patents in this District, including by using the Accused Instrumentalities to perform high frequency trading.

13. Venue is proper in this District under 28 U.S.C. §§ 1391 and 1400(b). Defendant has transacted business and committed acts of infringement in this District, including through its use of the Accused Instrumentalities in this District.

**COUNT 1 – CLAIM FOR INFRINGEMENT OF THE '286 PATENT**

14. Each of the allegations in the foregoing paragraphs are incorporated by reference as if fully set forth herein.

15. On May 28, 2019, the United States Patent and Trademark Office issued U.S. Patent No. 10,931,286, titled “Field programmable gate array with external phase-locked loop.” Exhibit 1.

16. Plaintiff is the owner of the '286 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

17. The claims of the '286 patent were duly issued by the United States Patent and Trademark Office and are presumed by statute to be valid.

18. The claims of the '286 patent are patent eligible under 35 U.S.C. §101.

19. The claims of the '286 patent are not directed to abstract ideas and recite technical solutions to technical problems related to, for example, processing delays caused by clock domain crossing circuits, and phase synchronization between receiver and transmitter side clocks. *See, e.g.*, '286 patent at 1:31-55.

20. The written description of the '286 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

21. On information and belief, Defendant has directly infringed (literally and equivalently) the '286 patent by, without a license or permission from Plaintiff, making, using, offering for sale, selling, or importing the Accused Instrumentalities in the United States to perform methods that infringe claims of the '286 patent.

22. On information and belief, the Accused Instrumentalities employ, implement, or utilize materially the same features such that one Accused Instrumentality is representative of all Accused Instrumentalities.

23. Defendant's use of the Accused Instrumentalities satisfies all claim limitations of one or more claims of the '286 Patent. For example, Defendant's use of the Accused Instrumentalities infringes claim 1 of the '286 patent, as shown in Exhibit 4 which is incorporated herein by reference.

24. Since at least service of this Complaint, Defendant's infringement has been and continues to be willful. Defendant has had knowledge of the '286 patent—and without a good faith belief of invalidity or noninfringement, has known or been willfully blind to the fact that its use of the Accused Instrumentalities infringes the '286 patent—since at least service of this Complaint.

25. Defendant and its customers derive benefits from Defendant's infringement including, for example, higher success rates and increased profits in latency sensitive trades, extremely latency sensitive trades, and other trading activities affected by latency.

26. Plaintiff has been damaged by Defendant's infringement of the '286 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

## **COUNT 2 – CLAIM FOR INFRINGEMENT OF THE '305 PATENT**

1. Each of the allegations in the foregoing paragraphs are incorporated by reference as if fully set forth herein.

2. On September 21, 2021, the United States Patent and Trademark Office issued U.S. Patent No. 11,128,305, titled "Field programmable gate array with external phase-locked loop." Exhibit 2.

3. Plaintiff is the owner of the '305 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

4. The claims of the '305 patent were duly issued by the United States Patent and Trademark Office and are presumed by statute to be valid.

5. The claims of the '305 patent are patent eligible under 35 U.S.C. §101.

6. The claims of the '305 patent are not directed to abstract ideas and recite technical solutions to technical problems related to, for example, processing delays caused by clock domain crossing circuits, and phase synchronization between receiver and transmitter side clocks, in FPGA systems. *See, e.g.*, '305 patent at 1:34-58.

7. The written description of the '305 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

8. On information and belief, Defendant has directly infringed (literally and equivalently) the '305 patent by, without a license or permission from Plaintiff, making, using, offering for sale, selling, or importing the Accused Instrumentalities, which infringe claims of the '305 patent, in the United States.

9. On information and belief, the Accused Instrumentalities employ, implement, or utilize materially the same features such that one Accused Instrumentality is representative of all Accused Instrumentalities.

10. The Accused Instrumentalities satisfy all claim limitations of one or more claims of the '305 Patent. For example, as shown in Exhibit 5, the Accused Instrumentalities infringe claim 1 of the '305 patent.

11. Since at least service of this Complaint, Defendant's infringement has been and continues to be willful. Defendant has had knowledge of—and without a good faith belief of invalidity or noninfringement, has known or been willfully blind to the fact that its use of the Accused Instrumentalities infringes—the '305 patent, since at least service of this Complaint.

12. Defendant and its customers derive benefits from Defendant's infringement including, for example, higher success rates and increased profits in latency sensitive trades, extremely latency sensitive trades, and other trading activities affected by latency.

13. Plaintiff has been damaged by Defendant's infringement of the '305 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

**COUNT 3 – CLAIM FOR INFRINGEMENT OF THE '381 PATENT**

14. Each of the allegations in the foregoing paragraphs are incorporated by reference as if fully set forth herein.

15. On February 7, 2023, the United States Patent and Trademark Office issued U.S. Patent No. 11,575,381, titled "Field programmable gate array with external phase-locked loop." Exhibit 3.

16. Plaintiff is the owner of the '381 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

17. The claims of the '381 patent were duly issued by the United States Patent and Trademark Office and are presumed by statute to be valid.

18. The claims of the '381 patent are patent eligible under 35 U.S.C. §101.

19. The claims of the '381 patent are not directed to abstract ideas and recite technical solutions to technical problems related to, for example, processing delays caused by clock domain crossing circuits, and phase synchronization between receiver and transmitter side clocks, in FPGA systems. *See, e.g.*, '381 patent at 1:39-62.

20. The written description of the '381 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

21. On information and belief, Defendant has directly infringed (literally and equivalently) the '381 patent by, without a license or permission from Plaintiff, making, using, offering for sale, selling, or importing the Accused Instrumentalities in the United States to perform methods that infringe claims of the '381 patent.

22. On information and belief, the Accused Instrumentalities employ, implement, or utilize materially the same features such that one Accused Instrumentality is representative of all Accused Instrumentalities.

23. Defendant's use of the Accused Instrumentalities satisfies all claim limitations of one or more claims of the '381 Patent. For example, as shown in Exhibit 6, Defendant's use of the Accused Instrumentalities infringes claim 1 of the '381 patent.

24. Since at least service of this Complaint, Defendant's infringement has been and continues to be willful. Defendant has had knowledge of—and without a good faith belief of invalidity or noninfringement, has known or been willfully blind to the fact that its use of the Accused Instrumentalities infringes—the '381 patent, since at least service of this Complaint.

25. Defendant and its customers derive benefits from Defendant's infringement including, for example, higher success rates and increased profits in latency sensitive trades, extremely latency sensitive trades, and other trading activities affected by latency.



26. Plaintiff has been damaged by Defendant's infringement of the '381 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

**JURY DEMAND**

27. Plaintiff demands a jury trial pursuant to Federal Rule of Civil Procedure 38.

**RELIEF REQUESTED**

Plaintiff prays for the following relief:

A. A judgment in favor of Plaintiff that Defendant has infringed the Asserted Patents, and that the Asserted Patents are valid and enforceable;

B. A judgment and order requiring Defendant to pay Plaintiff past and future damages arising out of Defendant's infringement of the Asserted Patents in an amount no less than a reasonable royalty, costs, expenses, and pre- and post-judgment interest for its infringement of the Asserted Patents, as provided under 35 U.S.C. § 284;

C. A permanent injunction prohibiting Defendant from further acts of infringement of the Asserted Patents;

D. A judgment and order requiring Defendant to provide an accounting and to pay supplemental damages to Plaintiff, including, without limitation, pre-judgment and post-judgment interest;

E. A judgment that Defendant's infringement is willful and enhanced damages and fees as a result of that willfulness under 35 U.S.C. § 284;

F. A finding that this case is exceptional under 35 U.S.C. § 285, and an award of Plaintiff's reasonable attorney fees and costs; and

G. Any and all other relief to which Plaintiff may be entitled.

Dated: December 24, 2024

Respectfully submitted,

/s/ Dale Chang

Dale Chang

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*\*Pro hac vice* application forthcoming

**ATTORNEYS FOR PLAINTIFF,  
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